

THE CLAIMS

1-10. (Cancelled)

11. (Previously Presented) A method of manipulating computer aided design (CAD) objects, comprising:

receiving user input to associate two CAD objects, wherein said user input identifies a coupling between said two CAD objects selected from a group of connections consisting of: a vertex-to-vertex connection, an axis-to-axis connection, an edge-to-axis connection, and a face-to-face connection;

displaying said two CAD objects according to the coupling identified by the user input;

calculating a reduction in degrees of freedom between said two CAD objects caused by said identified coupling; and

displaying an indication of said reduction in said degrees of freedom in association with the display of said two CAD objects.

12. (Previously Presented) The method of claim 11 wherein at least one of said two CAD objects comprises a group of subcomponents.

13. (Previously Presented) The method of claim 11 further comprising:

verifying that said identified coupling is consistent with a prior coupling between said two CAD objects before performing said displaying said two CAD objects.

14. (Previously Presented) The method of claim 11 further comprising:

receiving user input to position said two CAD objects relative to each other before receiving said user input that identifies a coupling between said two CAD objects; and

displaying said two CAD objects according to relative positioning.

15. (Previously Presented) The method of claim 14 further comprising:
calculating a reduction in degrees of freedom caused by said relative positioning of said two CAD objects; and
displaying said reduction in degrees of freedom in association with display of said two CAD objects.

16. (Previously Presented) The method of claim 11 wherein said receiving, displaying said two CAD objects, calculating, and displaying an indication are performed by a collaborative design application associated with a plurality of users.

17. (Previously Presented) The method of claim 16 wherein said collaborative design application maintains a virtual model including said two CAD objects, and wherein said displaying said two CAD objects and displaying said indication are performed by communicating only changes in said virtual model caused by said identified coupling.

18. (Previously Presented) The method of claim 16 further comprising:
locking one of said two CAD objects in response to user input from a respective user, prior to receiving user input to associate two CAD objects, to prevent other users from manipulating said locked CAD object.

19. (Previously Presented) The method of claim 16 further comprising:
unlocking said one of said two CAD objects after displaying said two CAD objects according to the identified coupling.

20. (Previously Presented) The method of claim 11 wherein said displaying said two CAD objects comprises:
applying a transformation matrix to at least one of said two CAD objects.

21. (Previously Presented) A computer aided design (CAD) system, comprising:
means for defining a virtual environment in which CAD objects are manipulated;
means for receiving input from a user to associate two CAD objects within said virtual environment, wherein said input identifies a coupling between said two CAD objects selected from a group of connections consisting of: a vertex-to-vertex connection, an axis-to-axis connection, an edge-to-axis connection, and a face-to-face connection;
means for displaying said two CAD objects according to the identified coupling;
means for determining a reduction in degrees of freedom caused by said identified coupling; and
means for displaying an indication of degrees of freedom associated with said two CAD objects after application of said identified coupling.

22. (Previously Presented) The CAD system of claim 21 wherein at least one of said two CAD objects comprises a plurality of subcomponents mutually associated using respective couplings.

23. (Previously Presented) The CAD system of claim 21 further comprising:
means for determining whether said identified coupling is consistent with a prior coupling applied to one of said two CAD objects.

24. (Previously Presented) The CAD system of claim 21 further comprising:
means for receiving input from said user to position said two CAD objects relative to each other; and
means for displaying said two CAD objects according to relative positioning.

25. (Previously Presented) The CAD system of claim 21 further comprising:
means for applying transformation matrix operations to CAD objects that correspond to user manipulations of said CAD objects.

26. (Previously Presented) A method, comprising:
providing a virtual environment in which computer aided design (CAD) objects are manipulated;
receiving input from a user to associate two CAD objects within said virtual environment, wherein said input identifies a coupling selection from predefined connection relationships;
displaying said two CAD objects according to the identified coupling;
determining a reduction in degrees of freedom caused by said identified coupling; and
displaying an indication of degrees of freedom associated with said two CAD objects after application of said identified coupling.

27. (Previously Presented) The method of claim 26 wherein at least one of said two CAD objects comprises a plurality of subcomponents mutually associated using respective couplings.

28. (Previously Presented) The method of claim 27 further comprising:
determining whether said coupling identified by said user is consistent with prior couplings applied to one of said two CAD objects.